MERCURY ADVISORY COMMITTEE MEETING
Virginia Department Environmental Quality
Richmond, Virginia, September 30, 2005

DEQ Air Division Perspective

List of Handouts:

1. EPA Clean Air Mercury Rule, Basic Information

2. VADEQ Clean Air Mercury Rule (Revision F05), Notice of Intended Regulatory Action (NOIRA), Agency Background Document

3. VADEQ Air Division September 15, 2005 Meeting Minutes Regulatory Ad-Hoc Advisory Group Concerning Clean Air Mercury Rule

4. VA Toxics Release Inventory Report Executive Summary 2003 Facility Reports, March 2005

5. VA DEQ Supporting Information - Regulatory Ad Hoc Advisory Group Concerning Clean Air Mercury Rule - September 7, 2005
    - Annual VA Mercury Air Emissions 2000 – 2003
    - Companies Reporting 2003 Mercury Emissions in Virginia
    - Maps of Mercury Advisories (VADPH) and Mercury Emission Sources (VADEQ TRI over 10lbs/yr)

6. Scientific Literature Pertinent to Mercury Deposition

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U.S. Environmental Protection Agency

Clean Air Mercury Rule

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Basic Information

On March 15, 2005, EPA issued the first-ever federal rule to permanently cap and reduce mercury emissions from coal-fired power plants. This rule makes the United States the first country in the world to regulate mercury emissions from coal-fired power plants.

- The Clean Air Mercury Rule will build on EPA's Clean Air Interstate Rule (CAIR) to significantly reduce emissions from coal-fired power plants -- the largest remaining sources of mercury emissions in the country. When fully implemented, these rules will reduce utility emissions of mercury from 48 tons a year to 15 tons, a reduction of nearly 70 percent.

- CAIR and the Clean Air Mercury Rule are important components of the Bush Administration's plan to improve air quality. The Administration remains committed to working with Congress to help advance the President's Clear Skies legislation in order to achieve greater certainty and nationwide emission reductions, but believes the U.S. needs regulations in place now.

- EPA believes it makes sense to address mercury, SO2 and NOx emissions simultaneously through CAIR and the Clean Air Mercury Rule. These rules will protect public health and the environment without interfering with the steady flow of affordable energy for American consumers and business.

- The Clean Air Mercury Rule establishes "standards of performance" limiting mercury emissions from new and existing coal-fired power plants and creates a market-based cap-and-trade program that will reduce nationwide utility emissions of mercury in two distinct phases. The first phase cap is 38 tons and emissions will be reduced by taking advantage of "co-benefit" reductions – that is, mercury reductions achieved by reducing sulfur dioxide (SO2) and nitrogen oxides (NOx) emissions under CAIR. In the second phase, due in 2018, coal-fired power plants will be subject to a second cap, which will reduce emissions to 15 tons upon full implementation.

- New coal-fired power plants ("new" means construction starting on or after Jan. 30, 2004) will have to meet stringent new source performance standards in addition to being subject to the caps.

- Mercury is a toxic, persistent pollutant that accumulates in the food chain. Mercury in the air is a global problem. While fossil fuel-fired power plants are the largest remaining source of human-generated mercury emissions in the United States, they contribute only a small amount (about 1 percent) of total annual mercury emissions worldwide.

- EPA's modeling shows that CAIR will significantly reduce the majority of the coal-fired power plant mercury emissions that deposit in the United States, and those reductions will occur in areas where mercury deposition is currently the highest. The Clean Air Mercury Rule is expected to make additional reductions in emissions that are transported regionally and deposited domestically, and it will reduce emissions that contribute to atmospheric mercury worldwide.

Mercury Emissions - A Global Problem

- Mercury emitted from coal-fired power plants comes from mercury in coal, which is released when the coal is burned. While coal-fired power plants are the largest remaining source of human-generated mercury emissions in the United States, they contribute very little to the global mercury pool. Recent estimates of annual total global mercury emissions from all sources -- both natural and human-generated -- range from roughly 4,400 to 7,500 tons per year. Human-caused U.S. mercury emissions are estimated to account for roughly 3 percent of the global total, and U.S. coal-fired power plants are estimated to account for only about 1 percent.

- EPA has conducted extensive analyses on mercury emissions from coal-fired power plants and subsequent regional patterns of deposition to U.S. waters. Those analyses conclude that regional transport of mercury emission from coal-fired power plants in the U.S. is responsible for very little of the mercury in U.S. waters. That small contribution will be significantly reduced after EPA's Clean Air Interstate Rule and Clean Air Mercury Rule are implemented.

    - U.S. coal-fired power plants emit mercury in three different forms: oxidized mercury (likely to deposit within the U.S.); elemental mercury, which travels hundreds and thousands of miles before depositing to land and water; and mercury that is in particulate form.

    - Because mercury can be transported thousands of miles in the atmosphere, and because many types of fish are caught and sold globally, effective exposure reduction will require reductions in global emissions.

    - The United States is leading an effort within the United Nations Environment Programme to create a program that would establish partnerships designed to help developing countries reduce mercury emissions. The partnerships will leverage resources, technical expertise, technology transfer, and information exchanges to provide immediate effective action that will result in tangible reductions of mercury use and emissions. It accelerates the work of the UNEP Mercury program, originally proposed by the U.S. at the 2003 UNEP Governing Council meeting.

Mercury and Fish

- Concentrations of mercury in the air are usually low. However, atmospheric mercury falls to Earth through rain, snow and dry deposition and enters lakes, rivers and estuaries. Once there, it can transform into, methylmercury, and can build up in fish tissue.

- Americans are exposed to methylmercury primarily by eating contaminated fish. Because the developing fetus is the most sensitive to the toxic effects of methylmercury, women of childbearing age are regarded as the population of greatest concern. Children who are exposed to methylmercury before birth may be at increased risk of poor performance on neurobehavioral tasks, such as those measuring attention, fine motor function, language skills, visual-spatial abilities and verbal memory.

Revison of December 2000 Finding

- Also on March 15, 2005, in a separate but related action, EPA revised and reversed its December 2000 finding that it was "appropriate and necessary" to regulate coal- and oil-fired coal-fired power plants under section 112 of the Clean Air Act. We are taking this action because we now believe that the December 2000 finding lacked foundation and because recent information demonstrates that it is not appropriate or necessary to regulate coal- and oil-fired utility units under section 112.

- EPA nevertheless believes it is important to regulate mercury emissions from coal-fired power plants. For that reason EPA has signed two complementary rules – CAIR and the Clean Air Mercury Rule, issued under sections 110(a)(2)(D) and 111 of the law, respectively. These rules will allow us to more effectively limit mercury emissions from these plants.

Cap and Trade Basics

- Today's rule establishes a cap-and-trade system for mercury that is based on EPA's proven Acid Rain Program. The Acid Rain Program has produced remarkable and demonstrable results, reducing SO2 emissions faster and at far lower costs than anticipated, and resulting in wide-ranging environmental improvements.

- In the Clean Air Mercury Rule, EPA has assigned each state and two tribes an emissions "budget" for mercury, and each state must submit a State Plan revision detailing how it will meet its budget for reducing mercury from coal-fired power plants. Two tribes that have coal-fired power plants that will be affected by this rule also have been assigned a mercury emissions budget.

- Today's rule includes a model cap-and-trade program that states can adopt to achieve and maintain their mercury emissions budgets. States may join the trading program by adopting the model trading rule in state regulations, or they may adopt regulations that mirror the necessary components of the model trading rule.

- Although states and tribes are not required to adopt the EPA-administered cap-and-trade program, the Agency believes most will do so. The state and tribal emission budgets are permanent, regardless of growth in the electric sector.

- The mandatory declining emissions caps in the Clean Air Mercury Rule, coupled with significant penalties for noncompliance, will ensure that the rule's mercury reduction requirements are achieved and sustained. At the same time, stringent emission monitoring and reporting requirements ensure that monitored data are accurate, that reporting is consistent among sources – and that the emission reductions occur. The flexibility of allowance trading creates financial incentives for coal-fired power plants to look for new and low-cost ways to reduce emissions and improve the effectiveness of pollution control equipment.

The Benefits of Cap-and-Trade Regulation over MACT

- For both a cap-and-trade system and a MACT, emissions limits are established and must be achieved.

- However, under a cap-and-trade system reductions and caps emissions are capped permanently and nationwide emissions can only go down. The ability to bank unused allowances for future use can lead to early reductions of mercury. A trading approach is forward-looking in its assessment of technology because it provides a continuous incentive for technology innovation.

- A traditional Section 112(d) MACT approach sets standards based on technology performance. Each plant subject to a MACT must meet a specific emissions limit. However, benefits of MACT are not always permanent: With shifts in coal use and with economic growth, nationwide emission reductions could erode over time. In addition, a MACT approach would not create as much continuous incentive for the development of new mercury control technology.

For More Information

- More information about mercury, EPA's efforts to reduce mercury emissions, and today's rule is available at www.epa.gov/mercury.

- More information about EPA/FDA's fish advisory go to website www.cfsan.fda.gov/~frf/sea-mehg.html

Virginia Regulatory Town Hall

townhall.state.va.us

Notice of Intended Regulatory Action (NOIRA) Agency Background Document

Approving authority name	State Air Pollution Control Board
Primary action	9 VAC 5 Chapter 140
Secondary action(s)	None
Regulation title	Regulation for Emissions Trading
Action title	Clean Air Mercury Rule (Revision F05)
Document preparation date	June 21, 2005

This information is required for executive review (www.townhall.state.va.us/dpbpages/apaintro.htm#execreview) and the Virginia Registrar of Regulations (legis.state.va.us/codecomm/register/regindex.htm), pursuant to the Virginia Administrative Process Act (www.townhall.state.va.us/dpbpages/dpb_apa.htm), Executive Orders 21 (2002) and 58 (1999) (www.governor.state.va.us/Press_Policy/Executive_Orders/EOHome.html), and the *Virginia Register Form, Style, and Procedure Manual* (http://legis.state.va.us/codecomm/register/download/styl8_95.rtf).

Purpose

Please describe the subject matter and intent of the planned regulatory action.

The purpose of the proposed action is to control mercury emissions in order to reduce the regional deposition of mercury and its subsequent entry into the food chain, while preventing emissions that may be detrimental to Virginia's environmental needs.

Statutory Authority

Please identify the section number and provide a brief statement relating the content of the statutory authority to the specific proposed regulation.

Section 10.1-1308 of the Virginia Air Pollution Control Law (Title 10.1, Chapter 13 of the Code of Virginia) authorizes the State Air Pollution Control Board to promulgate regulations abating, controlling and prohibiting air pollution in order to protect public health and welfare. Section 10.1-1322.3 indicates that the board may promulgate regulations to provide an emissions trading and banking program that results in net air emission reductions, creates an economic incentive for reducing air emissions, and allows for economic growth. However, no regulation shall prohibit the direct trading of credits or allowances between private industries provided such trades do not have an adverse impact on air quality in Virginia.

Need

Please provide a brief explanation of the need for and the goals of the new or amended regulation. In addition, detail the specific reasons why the agency has determined that the proposed regulatory action is essential to protect the health, safety, or welfare of citizens. Finally, delineate any potential issues that may need to be addressed as the regulation is developed.

Mercury is a toxic, persistent pollutant that accumulates in the food chain. Atmospheric mercury falls to earth through rain, snow and dry deposition and enters lakes, rivers and estuaries. Once there, it can transform into methylmercury, and can build up in fish tissue. Humans are exposed to methylmercury primarily by eating contaminated fish. Because the developing fetus is the most sensitive to the toxic effects of methylmercury, women of childbearing age are regarded as the population of greatest concern. Children who are exposed to methylmercury before birth may be at increased risk of poor performance on neurobehavioral tasks, such as those measuring attention, fine motor function, language skills, visual-spatial abilities and verbal memory. The Clean Air Mercury Rule is expected to reduce emissions from fossil fuel-fired power plants that are transported regionally and deposited domestically, and it will reduce emissions that contribute to atmospheric mercury worldwide.

Previously Virginia focused Mercury testing efforts on locations with possible nearby mercury contamination sources. In recent years, states from Florida to Maryland and from the Great Lakes to New England have discovered elevated levels of mercury in fish from waters that do not have any direct mercury sources. These findings prompted DEQ to conduct additional monitoring in waters without significant, known sources of mercury pollution. Elevated levels of mercury in some fish in the Blackwater River and the Great Dismal Swamp Canal, both in southeastern Virginia, and the Dragon Run Swamp and Piankatank River on the Middle Peninsula have been discovered. These areas are suspected of being contaminated with mercury as a result of air deposition.

Mercury is clearly a toxic pollutant that needs to be targeted at the source. Virginia's rivers and streams have been impacted by mercury, and the likely cause has been deposition of mercury from the air. The proposed regulatory action is essential to protect Virginia's air and water quality from the impacts from mercury emissions, thereby protecting the health of Virginia citizens.

Legal Requirements

Please identify the state and/or federal source of the legal requirements that necessitate promulgation of this proposed regulation, including: (1) the most relevant law and/or regulation, including Code of Virginia citation and General Assembly bill and chapter numbers, if applicable, and (2) promulgating entity, i.e., the agency, board, or person. Also, describe the legal requirements and the extent to which the requirements are mandatory or discretionary.

Promulgating Entity

The promulgating entity for this regulation is the State Air Pollution Control Board.

Identification of Specific Applicable Federal Requirements

Specific planning requirements

As required by § 112(n)(1)(A), EPA announced its finding that it was "appropriate and necessary" to regulate coal- and oil-fired electric utilities. This finding triggered a requirement for EPA to propose regulations to control air toxics emissions, including mercury, from these facilities. On January 30, 2004, EPA proposed a rule with two basic approaches for controlling mercury from power plants. One approach would require power plants to meet emissions standards reflecting the application of the "maximum achievable control technology" (MACT) determined according to the procedure set forth in § 112(d). If implemented, this proposal would reduce nationwide mercury by 14 tons or about 30 percent by early 2008. A second approach proposed by EPA would create a market-based "cap and trade" program that, if implemented, would reduce nationwide utility emissions of mercury in two phases. When fully implemented mercury emissions would be reduced by 33 tons (nearly 70 percent). EPA proposed to pursue the cap and trade approach either under § 111 or § 112.

The January 2004 EPA proposal also proposed to revise the agency's prior finding that is "appropriate and necessary" to regulate utility hazardous air emissions using § 112 MACT standards. This action would give EPA the flexibility to consider a more efficient and more cost-effective way to control mercury emissions. EPA also proposed to revise its original finding that it is "appropriate and necessary" to regulate utility hazardous air emissions using the MACT standards, an action that would give EPA the flexibility to consider a more cost-effective way to control mercury emissions.

In the context of § 111, EPA has interpreted the term “standard of performance” to include a cap-and-trade program, and has determined that a cap-and-trade program based on control technology available in the relevant time frame is the best system for reducing mercury emissions from existing coal-fired utility units.

On March 15, 2005, EPA issued the final Clean Air Mercury Rule (CAMR), which builds on EPA’s Clean Air Interstate Rule (CAIR) to significantly reduce mercury emissions from coal-fired power plants. It is anticipated that these rules will reduce utility emissions of mercury from 48 tons a year to 15 tons, a reduction of nearly 70 percent.

CAMR establishes standards of performance limiting mercury emissions from new and existing utilities and creates a market-based cap-and-trade program that will reduce nationwide utility emissions of mercury in two distinct phases. In the first phase, due by 2010, emissions will be reduced by taking advantage of co-benefit reductions that is, mercury reductions achieved while reducing SO_2 and NO_X under CAIR. In the second phase, due in 2018, utilities will be subject to a second cap, which will reduce emissions to 15 tons upon full implementation.

Emissions guidelines for coal-fired utility units existing as of January 30, 2004 have been promulgated under § 111(d) of the Act. In order for § 111 to be effected, the specific guidelines are promulgated in the Code of Federal Regulations at subpart HHHH of 40 CFR Part 60. States have some flexibility in how they implement the program, but at a minimum, regulations must be at least as stringent as the guidelines.

EPA's final rule was published in the Federal Register of May 18, 2005 (70 FR 28606), and consists of a cap-and-trade program for emissions of mercury. State plans are due by November 17, 2006.

Emissions trading requirements

Section 111(d)(1) authorizes EPA to promulgate regulations that establish a SIP-like procedure under which each state submits to EPA a plan that establishes standards of performance for any existing source for certain air pollutants, and which provides for the implementation and enforcement of such standards. A standard of performance is a rule that reflects emission limits to the degree achievable through the best system of emission reduction that EPA determines has been adequately demonstrated, considering costs and other factors. A cap-and-trade program reduces the overall amount of emissions by requiring sources to hold allowances to cover their emissions on a one-for-one basis; by limiting overall allowances so that they cannot exceed specified levels (the cap); and by reducing the cap to less than the amount of emissions actually emitted, or allowed to be emitted, at the start of the program. In addition, the cap may

be reduced further over time. Authorizing the allowances to be traded maximizes the cost-effectiveness of the emissions reductions in accordance with market forces. Sources have an incentive to endeavor to reduce their emissions cost-effectively; if they can reduce emissions below the number of allowances they receive, they may then sell their excess allowances on the open market. On the other hand, sources have an incentive to not put on controls that cost more than the allowances they may buy on the open market.

EPA has on a prior occasion authorized emissions trading under § 111(d): the Emission Guidelines and Compliance Times for Large Municipal Waste Combustors that are Constructed on or Before September 20, 1994 (40 CFR Part 60, subpart Cb) allows for a NO_X trading program implemented by individual states. It states (in § 60.33b(C)(2) that a state plan may establish a program to allow owners or operators of municipal waste combustor plants to engage in trading of NO_X emission credits. A trading program must be approved by EPA before implementation.

EPA has also had significant experience with the cap-and-trade program for utilities. Title IV, for the acid rain program, provides a national cap-and-trade program that covers SO_2 emissions from utilities. Non-electricity generating units are also included in the states' programs. Title IV requires sources to hold allowances for each ton of SO_2 emissions, on a one-for-one basis. EPA allocates the allowances for annual periods, in amounts initially determined by the statute, that decrease further at a statutorily specified time. This program has resulted in an annual reduction in SO_2 emissions from utilities from 15.9 million tons in 1990 (the year the Amendments were enacted) to 10.2 million tons in 2002 (the most recent year for which data is available). Emissions in 2002 were 9 percent lower than 2000 levels and 41 percent lower than 1980, despite a significant increase in electrical generation. As discussed elsewhere, at full implementation after 2010, emissions will be limited to 8.95 million tons, a 50 percent reduction from 1980 levels. The Acid Rain program allowed sources to trade allowances, thereby maximizing overall cost-effectiveness.

In addition, in the 1998 NO_X SIP Call, EPA promulgated a NO_X reduction requirement that affects 21 states and the District of Columbia. All of the affected jurisdictions are implementing the requirements through a cap-and-trade program for NO_X emissions primarily from utilities. These 61 programs are contained in SIP that EPA has approved; and EPA is administering the trading programs.

General Federal Requirements

§ 111, Standards of Performance for New Stationary Sources

Section 111(d) of the Clean Air Act requires U.S. Environmental Protection Agency (EPA) to establish procedures under which states submit plans to control certain existing sources of certain pollutants. EPA implemented § 111(d) by promulgating Subpart B of 40 CFR Part 60 establishing procedures and requirements for adoption and submittal of state plans for control of "designated pollutants" from "designated facilities". Designated pollutants are pollutants which are not included on a list published under § 108(a) of the Clean Air Act (National Ambient Air Quality Standards) or § 112(b)(1)(A) (Hazardous Air Pollutants), but for which standards of performance for new sources have been established under § 111(b). A designated facility is an existing facility which emits a designated pollutant and which would be subject to a standard of performance for that pollutant if the existing facility were new.

Subpart B of 40 CFR Part 60 provides that EPA publish guideline documents for development of state emission standards after promulgation of any standards of performance for designated pollutants. The documents must specify emission guidelines and times for compliance and include other pertinent information such as discussion of the pollutant's effects on public health and welfare and description of control techniques and their effectiveness and costs. The emission guidelines reflect the degree of emission reduction attainable with the best adequately demonstrated systems of emission reduction, considering costs as applied to existing facilities.

After publication of a final guideline document for the pollutant in question, the states must develop and submit plans for control of that pollutant from designated facilities. After the final plan submittal date, EPA

approves or disapproves each plan (or portion thereof). If a state plan (or portion thereof) is disapproved, EPA promulgates a federal plan (or portion thereof). These and related provisions of Subpart B are basically patterned after § 110 of the Clean Air Act and 40 CFR Part 51 (concerning adoption and submittal of state implementation plans under § 110).

Because failure to develop adequate designated pollutant regulations result in imposition of a federal program, meeting the basic requirements of the law and its associated regulations ensure that Virginia retains its rights to govern Virginia sources, and result in the efficient and economical performance of an important governmental function.

Designated pollutant controls are critical for two reasons. First, only a limited number of air pollutants potentially harmful to human health are regulated at the federal level. Second, health risks from small exposures to designated air pollutants can be high, depending on the substances involved. Designated pollutant emissions consist of particulate matter, carbon monoxide, dioxin/furan, and other substances, such as mercury, that are known or suspected of serious health effects. Mercury, in particular, can cause impaired neurological development, neuromuscular changes, performance deficits on tests of cognitive function, kidney effects, respiratory failure and death.

§ 112, Hazardous Air Pollutants

Under § 112, EPA is required to develop and maintain a list of hazardous air pollutants (HAPs), and to develop emission standards for these pollutants. Section 112(b) establishes the initial list of HAPs. This list includes pollutants that present a risk to human health and other serious environmental effects. EPA is required to review and modify this list from time to time; further, any person who wishes to modify the list may petition EPA to do so.

EPA, according to § 112(c), must establish a list of all categories and subcategories of major and area sources of the pollutants listed in § 112(b). Emission standards for the categories and subcategories must then be developed under § 112(d), including a certain percentage of the most-polluting area sources.

In § 112(d)(1), EPA is required to promulgate regulations establishing emission standards for each category or subcategory of major and area sources of hazardous air pollutants listed according to the requirements of §§ 112(b) and (c). Once EPA has identified the specific source categories of major and area sources that it intends to regulate, it must promulgate MACT standards for each. As provided in § 112(d)(2), MACT is "the maximum degree of reduction in emissions of the hazardous air pollutants subject to this section," taking into account cost, and any non-air quality health and environmental impacts and energy requirements. Section 112(d)(3) specifies that MACT for new sources must be as stringent as the emission control achieved in practice by the best controlled similar source. For existing sources, MACT must not be less stringent than the emission control that is achieved by the best controlled 12 percent of existing sources. Sources that have achieved an emission rate or reduction which complies with the applicable lowest achievable emission rate within a specified time period before the standard is proposed may be exempt.

Section 112(g) requires that after the effective date of a title V permit program, new and modified major sources must apply MACT. As described in §§ 112(g)(2)(A) and (B), modifying sources must meet the MACT for existing sources, and new sources must meet the MACT for new sources. If no applicable emissions limitations have been established, MACT will be determined on a case-by-case basis by states with approved title V programs. Section 112(g)(1)(A) also allows sources to avoid requirements for modifications through the substitution of offsets; § 112(g)(1)(B) requires EPA to publish guidance that identifies the relative hazard to human health resulting from HAP emissions in order to facilitate any offset.

Section 112(n) requires that EPA perform a study of the hazards to public health reasonably anticipated to occur as a result of emissions by electric utility steam generating units of pollutants listed under subsection (b). In this report, EPA must develop and describe alternative control strategies for emissions which may warrant regulation, including regulation of electric utility steam generating units if the results of the study

warrant it. Additionally, this section requires that EPA conduct a study of mercury emissions from electric utility steam generating units, municipal waste combustion units, and other sources, including area sources. Such study shall consider the rate and mass of such emissions, the health and environmental effects of such emissions, technologies which are available to control such emissions, and the costs of such technologies. Finally, this section requires that the National Institute of Environmental Health Sciences conduct, a study to determine the threshold level of mercury exposure below which adverse human health effects are not expected to occur. This study must include a threshold for mercury concentrations in the tissue of fish which may be consumed (including consumption by sensitive populations) without adverse effects to public health.

State Requirements

Section 10.1-1322.3 of the Code of Virginia indicates that the board may promulgate regulations to provide for an emissions trading program to achieve and maintain the NAAQS. The banking and trading program shall result in net air emission reductions, create economic incentive for reducing air emissions and allow for economic growth. In developing the regulations, the board shall consider (i) the definition and use of emissions reduction credits form mobile and stationary sources, (ii) offsets, (iii) interstate or regional trading, (iv) mechanisms needed to facilitate trading and banking, and (v) emissions allocations. However, no regulation shall prohibit the direct trading of credits or allowances between private industries provided such trades do not adversely impact air quality in Virginia. The regulations applicable to the electric power industry shall foster competition in the electric power industry, encourage construction of clean, new generating facilities, provide without charge new source set-asides of five percent for the first five plan years and two percent per year thereafter, and provide an initial allocation period of five years.

Substance

Please detail any changes that will be proposed. For new regulations, include a summary of the proposed regulatory action. Where provisions of an existing regulation are being amended, explain how the existing regulation will be changed.

The department is considering a number of alternatives (see below) with regard to this regulatory action. Several would involve the promulgation of regulations patterned after the EPA model rule or some variation thereof. If the department selects the emissions trading approach to meet the EPA requirements, it would necessitate the addition of a trading rule covering mercury. This program is similar in concept and structure to the NO_X SIP call emissions trading program now found in 9 VAC 5 Chapter 140. If the department selects other alternatives, it is not possible to specifically identify the resulting regulation at his time.

Alternatives

Please describe all viable alternatives to the proposed regulatory action that have been or will be considered to meet the essential purpose of the action. Also, describe the process by which the agency has considered, or will consider, other alternatives for achieving the need in the most cost-effective manner.

Alternatives (one or more or a combination thereof) to meet the purpose of this regulatory action are being considered by the Department. The alternatives being considered by the Department are discussed below. The degree to which the resultant regulation would (i) be approvable by EPA and enable Virginia to participate in the trading program, (ii) affect the costs to the regulated entities, and (iii) impact the environment will vary depending on the alternative selected.

1. Develop a regulatory program that would meet the requirements of the EPA CAMR and would regulate coal-fired EGUs and include all elements of the EPA model trading rule.

2. Develop a regulatory program that would meet the requirements of the EPA CAMR and would regulate coal-fired EGUs and include all elements of the EPA model trading rule. In addition, develop a regulatory mechanism (source-specific permits with emission caps or emission rate limits) that would regulate coal-fired EGUs to the extent necessary to keep associated emissions within Virginia's budget.

3. Develop a regulatory program that would regulate coal-fired EGUs to the extent necessary to keep associated emissions within Virginia's budget would not include any elements of the EPA model trading rule.

4. Develop a regulatory program that would regulate sources that are not coal-fired EGUs to the extent necessary to achieve the necessary reductions as would be required from coal-fired EGUs to keep associated emissions within Virginia's budget and would not include any elements of the EPA model trading rule.

5. Develop a regulatory program that would meet the requirements of the EPA CAMR and would regulate coal-fired EGUs and include all elements of the EPA model trading rule, except that the compliance dates would be more restrictive.

6. Develop a regulatory program that would meet the requirements of the EPA CAMR and would regulate coal-fired EGUs and include all elements of the EPA model trading rule. In addition, develop a regulatory mechanism that would regulate sources that are not coal-fired EGUs to the extent necessary to keep associated emissions at a level necessary to meet Virginia's environmental needs.

7. Take no action to develop a plan that would meet the requirements of the EPA CAMR.

Public Participation

Please indicate the agency is seeking comments on the intended regulatory action, to include ideas to assist the agency in the development of the proposal and the costs and benefits of the alternatives stated in this notice or other alternatives. Also indicate whether a public meeting is to be held to receive comments on this notice. Indicate that: (1) the agency is not holding a public meeting because the agency has authorized proceeding without holding a meeting or (2) the agency is holding a meeting. If a public meeting is to be held, indicate that the date, time and place of the meeting may be found in the calendar of events section of the Virginia Register of Regulations.

The department is soliciting comments on (i) the intended regulatory action, to include ideas to assist the department in the development of the proposal, (ii) the impacts of the proposed regulation on farm and forest land preservation, and (iii) the costs and benefits of the alternatives stated in this notice or other alternatives. All comments must be received by the department by 5:00 p.m. on August 10, 2005 in order to be considered. It is preferred that all comments be provided in writing to the department, along with any supporting documents or exhibits; however, oral comments will be accepted at the meeting. Comments may be submitted by mail, facsimile transmission, e-mail, or by personal appearance at the meeting, but must be submitted to Mary E. Major, Environmental Program Manager, Office of Air Regulatory Development, Department of Environmental Quality, P.O. Box 10009, Richmond, Virginia, 23240 (e-mail: memajor@deq.virginia.gov) (fax number: 804-698-4510). Comments by facsimile transmission will be accepted only if followed by receipt of the signed original within one week. Comments by e-mail will be accepted only if the name, address and phone number of the commenter are included. All testimony, exhibits and documents received are a matter of public record. Only comments

(i) related to the information specified in this notice and (ii) provided in accordance with the procedures specified in this notice will be given consideration in the development of the proposed regulation amendments.

A public meeting will be held by the department to receive comments on and to discuss the intended action. Information on the date, time, and place of the meeting is published in the Calendar of Events section of the Virginia Register. Unlike a public hearing, which is intended only to receive testimony, this meeting is being held to discuss and exchange ideas and information relative to regulation development.

Participatory Approach

Please indicate the extent to which an ad hoc advisory group will be used in the development of the proposed regulation. Indicate that: (1) the agency is not using the participatory approach in the development of the proposal because the agency has authorized proceeding without using the participatory approach; (2) the agency is using the participatory approach in the development of the proposal; or (3) the agency is inviting comment on whether to use the participatory approach to assist the agency in the development of a proposal.

Subject to the stipulations noted below, the department will form an ad hoc advisory group to assist in the development of the regulation. If you want to be on the group, notify the agency contact in writing by 5:00 p.m. on July 22, 2005 and provide your name, address, phone number and the organization you represent (if any). Notification of the composition of the ad hoc advisory group will be sent to all applicants. If you want to be on the group, you are encouraged to attend the public meeting mentioned above. The primary function of the group is to develop recommended regulation amendments for department consideration through the collaborative approach of regulatory negotiation and consensus. At its discretion, the department may dispense with the use of an ad hoc advisory group if it receives less than five applications. Multi-applications from a single company, organization, group or other entity count as one for purposes of making the decision specified in the preceding sentence.

Impact on Family

Please provided an assessment of the potential impact of the proposed regulatory action on the institution of the family and family stability including to what extent the regulatory action will: (1) strengthen or erode the authority and rights of parents in the education, nurturing, and supervision of their children; (2) encourage or discourage economic self-sufficiency, self-pride, and the assumption of responsibility for oneself, one's spouse, and one's children and/or elderly parents; (3) strengthen or erode the marital commitment; and (4) increase or decrease disposable family income.

It is not anticipated that these regulation amendments will have a direct impact on families. However, there will be positive indirect impacts in that the regulation amendments will ensure that the Commonwealth's air pollution control regulations will function as effectively as possible, thus contributing to reductions in related health and welfare problems.

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COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR DIVISION

INTRA AGENCY MEMORANDUM

TO: File

FROM: Mary E. Major
Policy Analyst

SUBJECT: Meeting Minutes,–September 15, 2005- Regulatory Ad Hoc Advisory Group Concerning Clean Air Mercury Rule (Rev. F05)

DATE: September 21, 2005

INTRODUCTION

At 9:30 a.m., September 15, 2005, a meeting of the ad hoc advisory group concerning the Clean Air Mercury Rule (CAMR) was held in the First Floor Conference Room, Department of Environmental Quality, 629 East Main Street, Richmond, Virginia. A record of meeting attendees is included as Attachment A.

SUMMARY OF DISCUSSION

The facilitator opened the meeting by announcing that the DEQ would make a request to the Attorney General for a formal opinion regarding the legal authority to trade mercury. No specific timeframe was given on when that opinion would be forthcoming. The group will proceed under the informal opinion that the State Air Pollution Control Board does not have authority to adopt a regulation that would permit the trading of mercury. The facilitator also reviewed the timeframe for submitting the proposed regulation to the SAPCB. Any position papers that members want to develop on issues the group is unable to achieve consensus on must be forwarded to the DEQ by late October-early November if they are to be included in the package of material that is forwarded to the board.

The group discussed pros and cons of the alternatives to trading that had been identified at the last meeting; Alternative 1, Statewide Averaging; Alternative 2, Unit Specific Controls and Alternative 3, Statewide Averaging with Unit Standards. No additional alternatives were identified. The issues reported herewith are not identified as either pro or con as there was not necessarily consensus as to the proper placement of the issues.

Alternative 1: Statewide Averaging

Many of the same issues brought up in the previous committee meeting were readdressed here with no consensus achieved. The statewide averaging proposal was described with the following key points:

Averaging is not trading, nothing legal changes hands
Averaging would affect all units
Averaging would be statewide not within a plant or facility
Statewide baseline basis for cap would be based on the average of 3 highest years between 2000-2004

Issues discussed pertaining to this option included:

Need to guarantee that the cap would be met within the Commonwealth.

Possibility of excess reductions going out of the Commonwealth which in turn provides incentive for over-control.

Question of legality about excess emissions trading out of the Commonwealth given current Attorney's General opinion and Section 112 of Clean Air Act and toxics.

Concern about hot spots: Must consider health implications as well as fish and water concentrations. Need to model to determine which areas are "hot spots".

Averaging is cost effective control relative to unit specific control. EPA web site identifies units and expected type of control per unit. Once controls are installed, costs associated with operating/maintaining controls.

New technologies emerging. There is some question as to when they will be commercially available.

The question was raised :Would controls be placed on older dirtier facilities (often times more costly to retrofit) or would utilities choose to over control at newer-cleaner plants? It was pointed out that the same facilities will be controlled for CAIR program. Some felt that additional reductions are necessary sooner than CAIR.

Impact on jobs: No units shut down as a result of being too costly to control, therefore, no jobs lost. It was mentioned that jobs would be generated as a result of need for pollution control installment, however, it was countered that job loss is permanent if plants are closed; jobs associated with pollution control equipment installation are temporary.

Alternative 2: Adopt Unit Specific Standard

Many of the same issues brought up in the previous committee meeting were

readdressed here with no consensus achieved. The Unit Specific Standard proposal was described with the following key points:

Possible standards include 90% reduction, 3mg/megawatt/hour or 0.6 lbs/trillion BTU.

Issues discussed pertaining to this option included:

Controls required to meet 90% for all units may not be available even though some plants are already meeting 90% control. 90% may not be correct percentage for all facilities.

Need for earlier timeframe for reductions: If using a multi-pollution reduction strategy sources would be granted a longer timeframe.

Legal compliance more assured.

Encourages clean technologies and the addition of jobs associated with new technologies. Some indicated that there would be job losses as a result of excessive cost for controls. Estimated national costs for mercury MACT projected to be $261 Billion. Unit by unit control less cost efficient to Virginia consumers.

Need expressed to eliminate hot spots: No consensus regarding hot spots. Debate centers around the amount of mercury generated vs. the amount of mercury Virginia receives from non-Virginia sources.

3. Merge state-wide averaging with Unit Standards:

Many of the same issues brought up in the previous committee meeting were readdressed here with no consensus achieved. The statewide averaging with unit standards proposal was described with the following key points:

Require specific reductions for plants in vulnerable or sensitive areas, average others; essentially a merger of the two previous options. The EPA expectations identified in the federal preamble regarding the controls that would be placed on existing units would become obligatory not an option.

Issues discussed pertaining to this option included:

Estimated approximately 75% of the facilities would need unit specific controls. These would be the facilities located within 60 miles of a health advisory for mercury contamination. Rivers are identified for health advisories; however, facilities must be located on rivers. Some advisories are based on previous industrial contamination, not current activity.

Atmospheric deposition data is as vital to the discussion as water discharge data. Need to model facilities for local health impacts. At least 11 facilities were identified as those needing unit specific controls and not eligible for averaging.

Cost of control is excessive for existing facilities to retrofit and still meet power production obligation for ratepayers. American Electric Power estimates 1.5 Billion dollars spent for pollution control in West Virginia alone that will translate to less pollution in Virginia.

Some members commented that this approach has no incentives to go beyond command and control due to inability to trade/sell excess mercury reduction credits.

Disagreement about whether EPA's analysis and final rule for mercury, which allows for interstate trading, adequately addressed the health concerns for people living near the facilities. EPA didn't look at any fish tissue data from Virginia when making its determination for necessary reductions in mercury, therefore, uncertainty concerning needed reductions.

Indication of limited ability for consensus regarding mercury control; Industry adamant about the ability for maximum flexibility, i.e. averaging and/or trading to reduce costs, others concerned that averaging will not address hot spot protection for the Virginia rivers already impacted with mercury health advisories nor will it afford adequate protection for people living near those facilities.

INFORMATION TO BE DISCUSSED AT THE NEXT MEETING, SEPTEMBER 22, 2005

The group was asked to provide a definition of "hot spot" by Tuesday, September, 20th, for discussion at the next meeting.

The group did agree that additional discussion was necessary on the following issues:

Role of Non-EGUs

Not everyone agrees that the emission limits are protective of human health: Need to identify core issues and also identify which issues are not negotiable.

TEMPLATES\PROPOSED\AH08
REG\DEV\F05-AH08-2

Attachments

Executive Summary
Virginia Toxics Release Inventory (TRI) Report -
Summary of Data from 2003 Facility Reports
(March 2005)

In March of each year, the Virginia Department of Environmental Quality (the Department) publishes the Virginia Toxics Release Inventory (TRI) Report, in accordance with Virginia Code § 10.1-1186.1. The Virginia TRI Report contains information on the release, transfer, or other management of listed chemicals and chemical categories, as reported by Virginia industries in specified industrial sectors and by federal facilities located within the Commonwealth. The facilities' reports are required under federal law, known as the Emergency Planning and Community Right-to-Know Act (EPCRA), or SARA Title III. The Virginia TRI Report is a multi-media report covering air, water, and waste management activities, and it addresses a variety of handling practices, including releases, recycling, energy recovery, and on-site and off-site treatment and disposal.

This year's Virginia TRI report covers calendar year, or "reporting year," 2003, the most recent year for which data is available, and includes all reports and revisions received by the Department on or before December 15, 2004. For calendar year 2003, 501 Virginia facilities filed 1919 individual reports on the release, transfer, or management of TRI chemicals or chemical categories. This was a decrease from the 504 facilities (<1%) and 2010 reports (4.5%) filed for calendar year 2002. For 2003, Virginia facilities reported the release, transfer, or management of 160 chemicals and chemical categories, out of the more than 650 chemicals and chemical categories that are subject to the TRI. For 2002, 157 chemicals and chemical compounds had been reported.

Virginia facilities reported the release, transfer, or on-site management of almost 379 million pounds of TRI chemicals during calendar year 2003 (a 6.5% decrease from 2002). Of this total:

- *64.8 million pounds of TRI chemicals were released on-site at reporting Virginia facilities (an 8.9% decrease from 2002);*
- *64.9 million pounds of TRI chemicals were transferred off-site from reporting Virginia facilities for treatment, recycling, energy recovery, or disposal (a 3.6% decrease from 2002); and*
- *249 million pounds of TRI chemicals were managed on-site by treatment, recycling, or energy recovery (a 6.6% decrease from 2002).*

The Virginia TRI Report addresses separately those TRI chemicals that the U.S. Environmental Protection Agency (EPA) has designated as persistent bioaccumulative toxins (PBTs). These chemicals remain in the environment for long periods of time, are not readily destroyed, and build up or accumulate in body tissue. According to the reports, Virginia facilities reported the release, transfer, or on-site management of almost 1.8 million pounds of TRI chemicals during calendar year 2003 (a decrease of 11.8% from 2002). Of this total:

- *387,763 pounds of PBT chemicals were released on-site at reporting Virginia facilities (a 6.3% increase from 2002);*

- *1.3 million pounds of PBT chemicals were transferred off-site from reporting Virginia facilities for treatment, recycling, energy recovery, or disposal (a 16.8% decrease from 2002); and*

- *An additional 35,154 pounds of PBT chemicals were managed on-site by treatment, recycling, or energy recovery (a 57% increase from 2002).*

Dioxins and dioxin-like compounds account for just over 195 grams (approximately 0.43 pounds) of the PBT chemicals released, transferred, or managed by Virginia facilities during calendar year 2003.

As required by statute, the Virginia TRI Report also addresses industrial sectors (identified by standard industrial code), facilities, and facility location (jurisdiction). For calendar year 2003, three reporting industrial sectors account for 67% of the total on-site releases to the environment. These were: electric, gas, and sanitary services; paper and allied products; and chemicals and allied products. For calendar year 2003, three sectors contributed 57.5% of the total on-site management of TRI chemicals. These were: paper and allied products; national security and international affairs; and chemicals and allied products. The text of the report details further information about the industrial sectors, facilities, and jurisdictions with the largest reported on-site releases and other on-site management of TRI chemicals.

The Virginia TRI Report provides the public with information concerning specified toxic chemicals and chemical compounds that are manufactured, processed, or otherwise used at categories of Virginia facilities. This information can help both the public and industry identify potential concerns and develop effective strategies for reducing toxic chemical usage and release. However, the data in the Virginia TRI Report does not represent a measure of the public's exposure to chemicals, nor does it assess risk. Many of the releases are regulated and permitted under other state and federal programs that are designed to protect human health and the environment. Because of differences in reporting schedules and receipt of reports, the information in the Virginia TRI Report will not completely match the information in the national Toxics Release Inventory - Public Data Release, as published by EPA.

It is the policy of the Virginia Department of Environmental Quality to protect the environment of Virginia in order to promote the health and well-being of the Commonwealth's citizens. The Department implements numerous programs, as described at http://www.deq.virginia.gov/programs/homepage.html. The Department is committed to pollution prevention and elimination or reduction of waste at the source of generation. The Department is also committed to integrating the knowledge and opinions of others into its decisions. The publication of this Virginia Toxics Release Inventory Report, under Va. Code § 10.1-1186.1, is one way the Department disseminates information on toxic chemicals to Virginia's citizens, industry, and government. All parts of this agency and other sectors of government, all Virginia businesses and industry, and all Virginia's citizens have a role in managing and controlling the release of toxic chemicals in the Commonwealth.

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR DIVISION

INTRA AGENCY MEMORANDUM

TO: File

FROM: Mary E. Major
Policy Analyst

SUBJECT: Meeting Minutes,–September 7, 2005- Regulatory Ad Hoc Advisory Group Concerning Clean Air Mercury Rule (Rev. F05)

DATE: September 12, 2005

INTRODUCTION

At 9:30 a.m., September 7, 2005, a meeting of the ad hoc advisory group concerning the Clean Air Mercury Rule (CAMR) was held in the First Floor Conference Room, Department of Environmental Quality, 629 East Main Street, Richmond, Virginia. A record of meeting attendees is included as Attachment A.

SUMMARY OF DISCUSSION

A number of presentations were given by DEQ staff as well as information provided by Dr. Tripathi of the Virginia Department of Health (VDH) regarding health advisories issued by the VDH. These advisories are based upon the amount of mercury found in tissue of fish sampled from Virginia waters. Dr. Tripathi explained that five years ago 1 ppm (parts per million) was the level of mercury needed to issues an advisory. Today that level has been reduced to 0.5 ppm. The advisory recommends that no pregnant women or children eat fish caught from waters where levels of mercury exceed the 0.5 ppm level.

Alex Baron of DEQ reviewed the sampling methodology used by DEQ and indicated that all fish sampling data was available on the DEQ web site. He also indicated that there were no significant changes between 2000 and 2003 but that in 2004 there was an increase in the number of river basins and fish species sampled. In several instances it appeared that no obvious industrial source could be specifically identified for the levels of mercury found in several of the more pristine rivers in Virginia.

Information was also presented about a study being conducted at the University of Virginia that is evaluating both atmospheric deposition of mercury and fish tissue data.

The results of that study are not expected until later this fall.

The group discussed some members' frustrations over the inability to allow for trading of mercury and whether the opinion of not being able to trade mercury was correct. Dominion maintains that DEQ does have the authority to develop trading rules under Section 1308 of the Code of Virginia. Several members indicated that a formal opinion from the Attorney General would be beneficial. The opinion was expressed that regardless of whether the Attorney General's view of state law is correct, the EPA model trading program is also illegal under federal law.

The issue of whether to allow a Federal Implementation Plan (FIP) to be issued for Virginia was also discussed, including the implications of such action. Some members indicated that the state could let the FIP be issued then take more time to develop the State Implementation Plan (SIP), suggesting that the federal government would not act as long as the state was working toward a SIP. Others indicated that the state should not abrogate its responsibility to control mercury from its own sources and that such action would be viewed as irresponsible.

<u>Alternatives to cap-n-trade were discussed:</u>

1. State-wide Averaging;
   -Some suggest that this is a poor choice to trading as it would remove all incentives for over control,
   -Affect all units,
   -Guarantee that the cap would be met within the Commonwealth,
   -Who is accountable if the state-wide average is not met?
   -How to allocate?
   -How to enforce?
   -How do you ensure safeguards for hot spots?
   -What is the emissions rate?, cap?
   -What level is necessary to achieve necessary fish tissue reductions to prevent the health advisories?

2. Adopt Unit Specific Standard
   -90% reduction
   3mg/megawatt/hour
   0.6 lbs/trillion BTU
   Need for earlier timeframe for reductions: If using a multi-pollution reduction strategy granted a longer timeframe.

3. Merge state-wide averaging with MACT Standard:
   Specific reductions for plants in vulnerable or sensitive areas, average others
   Make EPA expectations identified in the federal preamble obligatory not and option.
   Some members commented that this approach has no incentives to go beyond command and control.

Other incentives? Tax incentives?

Dominion also offered to facilitate the presentations of several consultants to review modeling and bio-accumulative issues pertaining to mercury. Interest was indicated in a review of a report on Virginia-specific issues that could be forwarded to committee members.

Other states activities:
Information was distributed concerning activities in the following states: Connecticut, Massachusetts, New Jersey, Pennsylvania and Wisconsin.

INFORMATION TO BE DISCUSSED AT THE NEXT MEETING, SEPTEMBER 7, 2005

The group was asked to forward and additional options to cap and trade that they wish to discuss at future meetings to Melissa Porterfield at DEQ by Monday, September 12th.

The group did agree that additional research and discussion was necessary on a number of issues, as follows.

Need a list of EGUs and the corresponding heat input data

Continue the discussion of Alternatives to trading

Not everyone agrees that the emission limits are protective of human health:

Need to identify core issues and also identify which issues are not negotiable.

Discussion on alternatives to cap-n-trade
Other states activities

Inclusion of non-EGUs

TEMPLATES\PROPOSED\AH08
REG\DEV\F05-AH08-2

Attachments

VA DEQ Supporting Information
Regulatory Ad Hoc Advisory Group Concerning Clean Air Mercury Rule
September 7, 2005

Annual Virginia Mercury Air Emissions As Reported To TRI

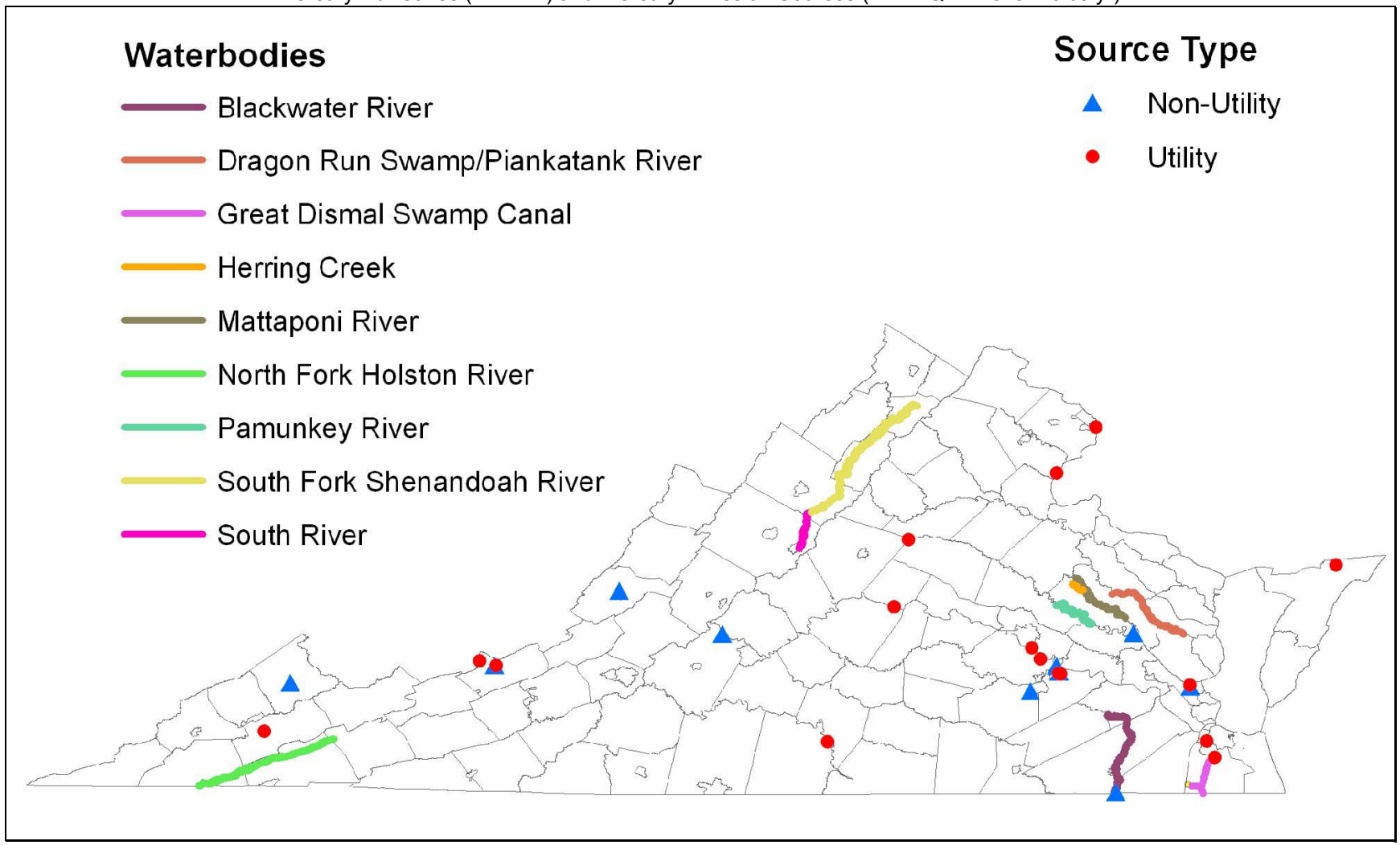
Year	TRI (lbs) All Sources	TRI (lbs) Utility
2000	4638	3333
2001	3414	1991
2002	2140	1272
2003	2092	1132

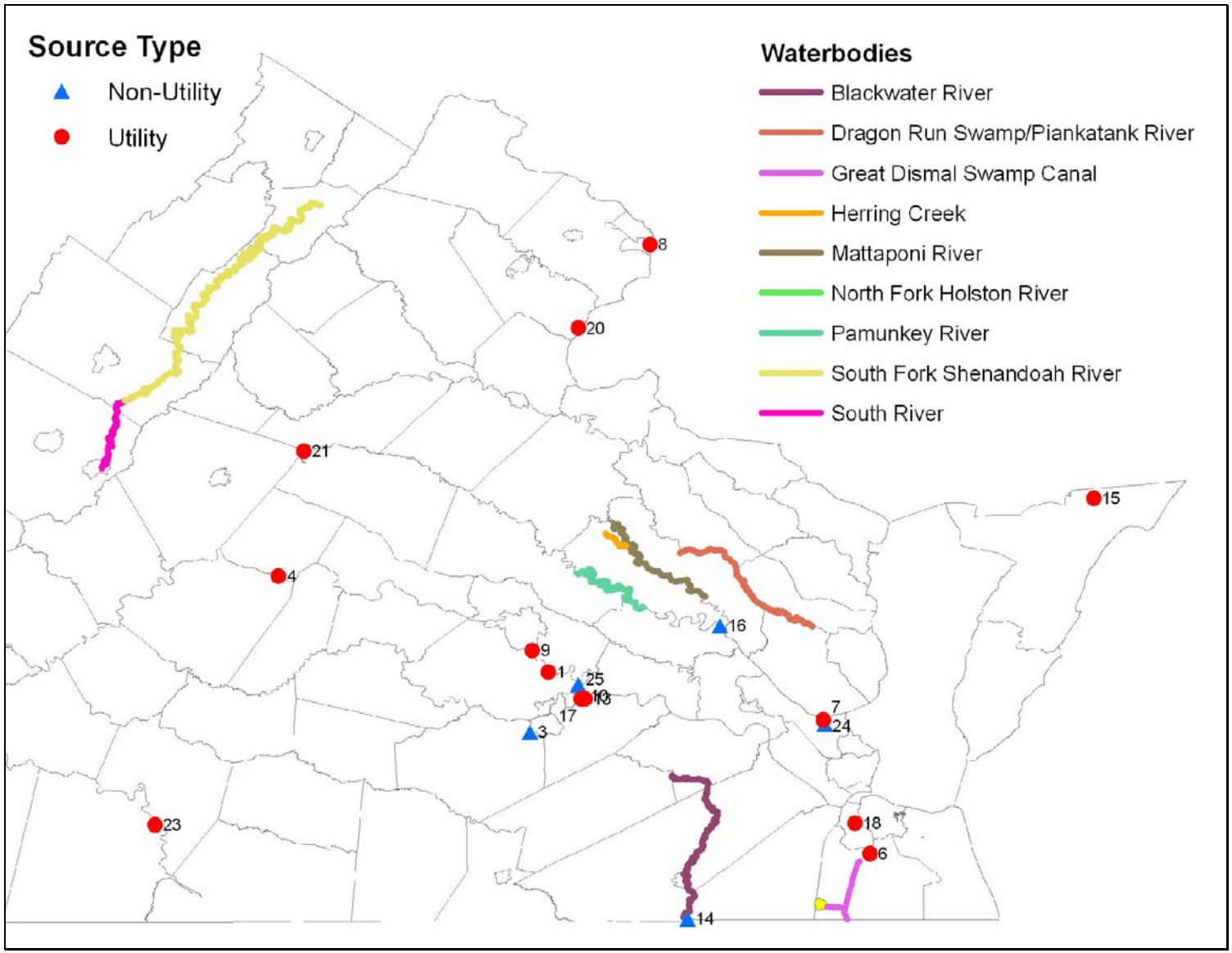
Companies Reporting 2003 TRI Mercury Emissions in Virginia

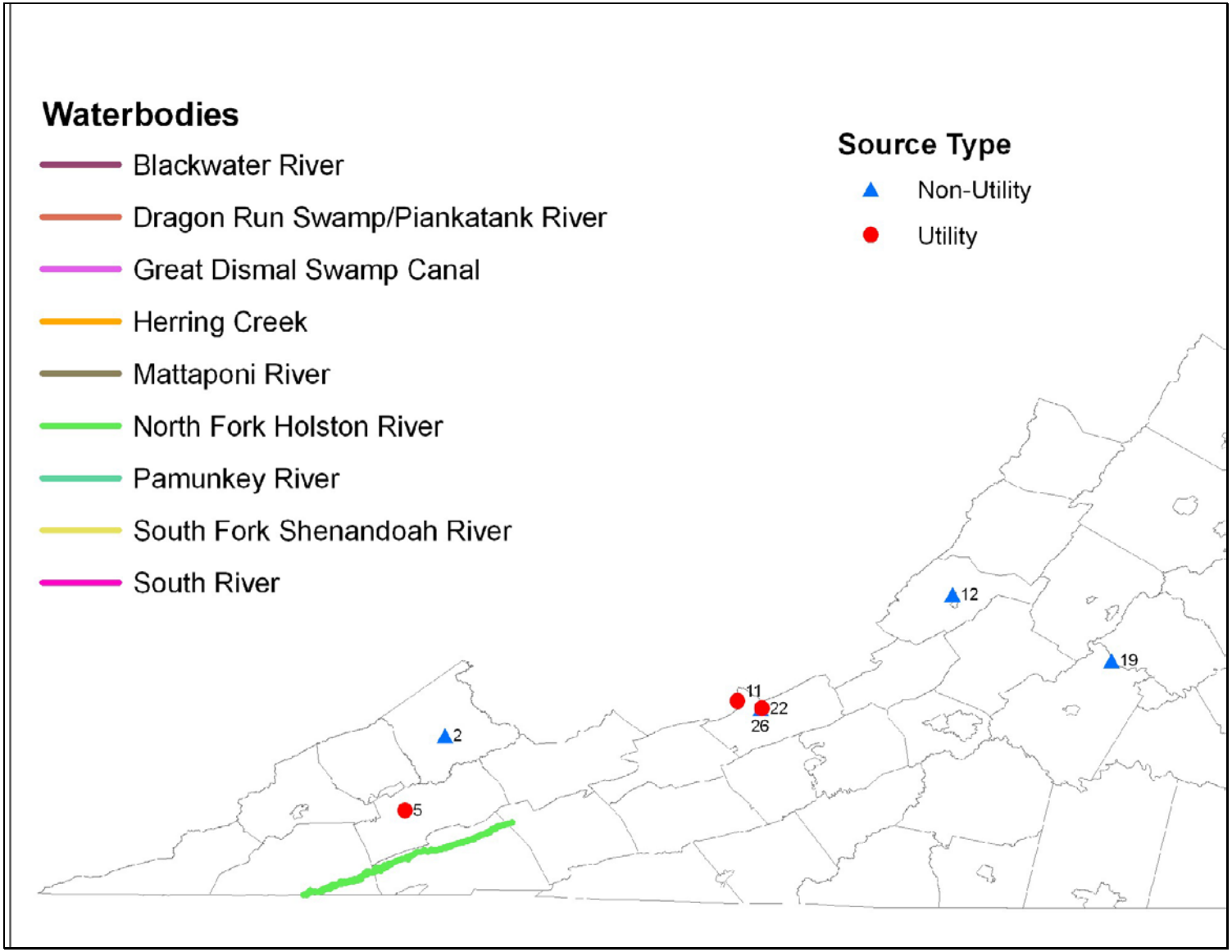
Company Name	Reported 2003 TRI Hg Emissions(lbs)
Dominion – Chesterfield	370
Jewell Coal & Coke	342
Chaparral Steel	310
Dominion – Bremo	170
AEP – Clinch River	148
Chesapeake Energy	140
Dominion – Yorktown	110
Potomac River Generating Station	70.6
Cogentrix of Richmond	64.8
Stone Container (Hopewell)	63.4
AEP – Glen Lyn	63
Meadwestvaco	55.5
Hopewell Cogen	53.4
International Paper	43.4
Commonwealth Chesapeake Power	43.3
Stone Container (West Point)	42.8
James River Cogen	28.7
Cogentrix Virginia	27.4
Georgia-Pacific (Big Island)	26.5
Dominion – Possum Point	26
Gordonsville Power Station	22
Cinergy Solutions of Narrows	21.7
Dominion – Clover	17
Yorktown Refinery	14.8
Phillip Morris	10.4
Celanese Acetate – Celco	10.2
Global Stone (Shenandoah) Quarry	7.95
Solite/Giant Resource	7.33
Roanoke Cement	5.9
Invista	1.9
Mecklenburg Cogen	1.51
DuPont – Front Royal	1.2
Dominion – Altavista	1
Intermet – Archer Creek	1
Southampton Power Station	1
Griffin Pipe	0.74
Intermet New River Foundry	0.42
Global Stone Chemstone (Winchester)	0.4
Global Stone (Shenandoah) Lime Plant	0.4
Intermet Radford Foundry	0.14
Meadwestvaco (Carbon Plant)	0.11
Birchwood Power	0.1
Roanoke Electric Steel	0

Shaded Facilities Included on EPA's Inventory
Facilities in Italics subject to the Boiler MACT

VA DEQ Supporting Information - Regulatory Ad Hoc Advisory Group Concerning Clean Air Mercury Rule - September 7, 2005
Mercury Advisories (VADPH) and Mercury Emission Sources (VADEQ TRI over 10lbs/yr)




Source Type
Non-Utility
Utility
Waterbodies
Blackwater River
Dragon Run Swamp/Piankatank River
Great Dismal Swamp Canal
Herring Creek
Mattaponi River
North Fork Holston River
Pamunkey River
South Fork Shenandoah River
South River
8
20
21
15
4
16
9
1
25
17
3
7
24
23
18
6
14


Waterbodies
Blackwater River
Dragon Run Swamp/Piankatank River
Great Dismal Swamp Canal
Herring Creek
Mattaponi River
North Fork Holston River
Pamunkey River
South Fork Shenandoah River
South River
Source Type
Non-Utility
Utility
12
19
11
22
26
2
5

ID	Plant Name	Facility City	Facility County	Mercury (lb/yr)	Utility
1	Dominion - Chesterfield Power Station	Chester	Chesterfield County	370	Y
2	Jewel Coke Company LLP	Vansant	Buchanan County	342.26	N
3	Chaparral Steel	Petersburg	Dinwiddie County	310	N
4	Dominion - Bremo Power Station	Bremo Bluff	Fluvanna County	170	Y
5	American Electric Power-Clinch River Plant	Cleveland	Russell County	148	Y
6	Dominion - Chesapeake Energy Center	Chesapeake	Chesapeake City	140	Y
7	Dominion - Yorktown Power Station	Yorktown	York County	110	Y
8	Potomac River Generating Station	Alexandria	Alexandria City	70.6	Y
9	Cogentrix of Richmond	Richmond	Richmond City	64.79	Y
10	Stone Container Corporation Hopewell	Hopewell	Hopewell City	63.4	N
11	American Electric Power Glen Lyn	Glen Lyn	Giles County	63	Y
12	MeadWestvaco Packaging Resource Group	Covington	Covington City	55.5	N
13	Hopewell Cogeneration Ltd Partnership	Hopewell	Hopewell City	53.39	Y
14	International Paper Company	Franklin	Isle of Wight County	43.38	N
15	Commonwealth Chesapeake Power Station	New Church	Accomack County	43.3	Y
16	Stone Container Enterprises dba Smurfit	West Point	King William County	42.8	N
17	James River Cogeneration Company	Hopewell	Hopewell City	28.7	Y
18	Cogentrix Virginia Leasing Corp	Portsmouth	Portsmouth City	27.4	Y
19	Georgia Pacific Corp Big Island Plt	Big Island	Bedford County	26.5	N
20	Dominion - Possum Point	Dumfries	Prince William County	26	Y
21	Dominion - Gordonsville Power Station	Gordonsville	Louisa County	22	Y
22	Cinergy Solutions of Narrows LLC	Narrows	Giles County	21.7	Y
23	Dominion - Clover Power Station	Clover	Halifax County	17	Y
24	Giant Yorktown Refinery	Grafton	York County	14.8	N
25	Philip Morris USA Inc - Park 500	Chester	Chesterfield County	10.4	N
26	Celanese Acetate LLC	Narrows	Giles County	10.2	N

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4. The Emissions and Environmental Impact of PM10 and Trace Elements from a Modern Coal-fired Power Plant equipped with ESP and Wet FGD. Fuel processing Technology, Volume 85, Issues 6-7, 15 June 1004, pages 641-656.
5. Foliar Exchange of Mercury as a Function of Soil and Air Mercury Concentrations. Science of the Total Environment, Volume 324, Issues 1-3, 25 May 2004, Pages 271-279.
6. Modeling the Atmospheric Transport and Deposition of Mercury to the Great Lakes. Environmental Research, Volume 95, Issue 3, July 2004, Pages 247-265.
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11. On the Effect of Spatial Resolution on Atmospheric Modeling. The Science of the Total Environment, Volume 304, Issues 1-3, 20 March 2003, Pages 73-81.
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13. Accumulation and Transformation of Atmospheric Mercury in Soil. The Science of the Total Environment, Volume 304, Issues 1-3, 20 March 2003, Pages 209-214.
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15. Atmospheric Particulate Mercury Concentration and Its Dry Deposition Flux in Changchun City, China. The Science of the Total Environment, Volume 281, Issues 1-3, 17 December 2001, Pages 229-236.
16. Long-term investigation of Atmospheric Mercury Contamination in Connecticut. Chemosphere, Volume 45, Issue 6-7, November 2001, Pages 1033-1043.
17. Modeling Atmospheric Mercury Transport and Deposition across Europe and the UK. Atmospheric Environment, Volume 35, Issue 32, November 2001, Pages 5455-5466.
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19. Developing Consensus: Mercury Science and Policy in NAFTA Countries (Canada, United States and Mexico). The Science of the Total Environment, Volume 261, Issues 1-3, 16 October 2000, Pages 185-193.

20. Modeling Assessment of Transport and Deposition Patterns of Anthropogenic Mercury Air Emissions in the United States and Canada. The Science of the Total Environment, Volume 259, Issues 1-3, 2 October 2000, Pages 145-157.
21. A Sensitivity Analysis on the Atmospheric Transformation and Deposition of Mercury in North-eastern USA. The Science of the Total Environment, Volume 259, Issues 1-3, 2 October 2000, Pages 169-181.
22. Atmospheric Mercury Deposition in Guizhou, China. The Science of the Total Environment, Volume 259, Issues 1-3, 2 October 2000, Pages 223-230.
23. A North American Inventory of Anthropogenic Mercury Emissions. Fuel Processing Technology, Volumes 65-66, June 2000, Pages 101-115.
24. Current Methods and Research Strategies for Modeling Atmospheric Mercury. Fuel processing technology, Volumes 65-66, June 2000, Pages 459-471.
25. A Regional Scale Modeling Study of Atmospheric Transport and Transformation of Mercury. I. Model Development and Evaluation. Atmospheric Environment, Volume 34, Issue 28, 2000, Pages 4933-4944.
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